

*Cydia grunertiana* (Ratzeburg, 1868), stat. rev.  
— an ignored species of Tortricidae

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**Summary**

*Cydia grunertiana* (Rtzb.), a tortricid moth whose larvae feed in bark of larch trees, is treated as a species separate from *C. pactolana* (Zell.), with which it has previously been synonymised. The adult moths and their genitalia are described, compared and illustrated. The biology of *grunertiana* is summarised, based on literature and personal observations. The literature dealing with *grunertiana* is listed, and the distribution of the species is outlined. The species is probably restricted to Central Europe, and we consider that its occurrence in Denmark is due to recent colonisation.

**Résumé**

*Cydia grunertiana* (Rtzb.), Tortricide dont la chenille se nourrit dans l'écorce des mélèzes, est considérée comme une espèce distincte de *C. pactolana* (Zell.) avec laquelle elle avait été mise en synonymie. Description, comparaison et illustration de l'imago et des genitalia. Exposé de la biologie de *grunertiana* basé sur la littérature et des observations personnelles. Présentation de la littérature sur *grunertiana* et exposé de la répartition de cette espèce, probablement restreinte à l'Europe centrale ; les auteurs estiment que son apparition dernièrement au Danemark est due à une colonisation récente.

**Zusammenfassung**

*Cydia grunertiana* (Rtzb.), eine auf Lärchenrinde lebende Tortricide, ist eine eigene Art und nicht identisch mit *C. pactolana* (Zell.), mit welcher sie früher oft synonymisiert worden ist. Die Falter und ihre Genitalien sind beschrieben, verglichen und abgebildet. Die Biologie von *grunertiana*, wie schon publiziert und durch persönliche Beobachtungen bestätigt, ist zusammengefasst. Die Literatur welche *grunertiana* behandelt ist aufgeführt, und die Verbreitung der Art angegeben. Die Art ist wahrscheinlich mitteleuropäisch und wir vermuten, dass sich die Art in Dänemark erst kürzlich angesiedelt hat.

## Introduction

In 1990, the first author noticed old spinnings with excrement from Microlepidoptera larvae on trunks of larch (*Larix*) in a plantation on the Danish peninsula of Jutland. He thought they might belong to *Cydia zebeana* (Ratzeburg), and during the following winter he returned to the locality and collected some larvae. To his surprise he bred from these some specimens of another *Cydia* species, which was unknown to him. An examination of the genitalia showed great similarity to those of *C. pactolana* (Zeller), a species which has a different colour of the forewings. A search in the relevant literature showed that Schütze (1931) described the biology of *Grapholitha grunertiana* (Rtzb.), which fits well with the species bred from Jutland.

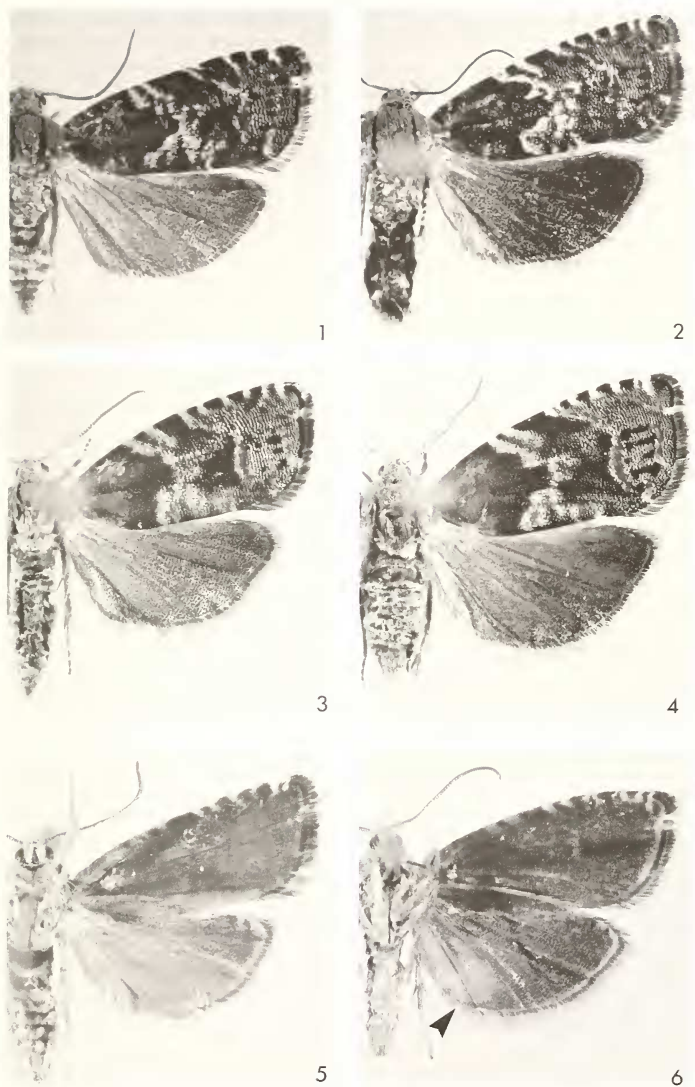
## History

“Diese Art hat eine merkwürdige Geschichte” (Escherich, 1931). It was first described by the famous forest entomologist J. T. C. Ratzeburg in 1868 from a single specimen bred from a larch trunk in Silesia (Poland), and it was named after its discoverer, a forest supervisor Grunert. Ratzeburg separated *grunertiana* from what he called *dorsana*, under which name he combined several coniferous feeding *Cydia* species, including *pactolana*.

*C. grunertiana* was not mentioned again in the literature until Rebel (1901) listed it as a synonym of *pactolana*. However, a few years later Rebel (1907) wrote: “Auch diese Form erscheint mit Unrecht als blosses Synonym von *Gr. Pactolana* Z. in der neuen Katalogsaufgabe (Nr. 2190) angeführt”. Rebel had received a pair of bred specimens (probably from Schütze), and based on these he concluded: “Es erscheint sehr wahrscheinlich, dass nähere Untersuchungen, namentlich der ersten Stände, eine artliche Trennung der Lärchenform (*Grunertiana*) von *Pactolana* bestätigen werden”.

The leading tortricid specialist of that time, Julius von Kennel, did not even mention *grunertiana* when he treated the European Tortricidae (Kennel, 1904), and in his monograph of the Palaearctic Tortricidae (Kennel, 1908- 21) he synonymised it with *pactolana* without comment.

At the beginning of this century Schütze rediscovered the larva of *grunertiana* and bred out a series of moths. He concluded (1911) that *grunertiana* should be regarded as a “variety” of *pactolana*. A few years later Thomann (1914) bred *grunertiana*, which he called “Ein beinahe sagenhaftes Tierchen”, and he described in detail its biology and differences to *pactolana*. This paper also included descriptions and



Figs 1-6. Adults of *Cydia grunertiana* (Rtzb.) (1,2,5) and *C. pactolana* (Zell.) (3,4,6). 1,3 — Male; 2,4 — Female; 5,6 — Male, ventral. (Fig. 6 with arrow showing patch of light yellowish scales.)

figures of the male genitalia of the two taxa (by Standfuss), which was very unusual at that time. Standfuss, however, misinterpreted details in the genitalia, and therefore he concluded that the differences between them were larger than they actually are.

Escherich (1931) followed Thomann and treated *grunertiana* as a separate species, whereas it was not even mentioned by Hering (1932) in his keys to the Central European Lepidoptera.

In his review of the Palaearctic Tortricidae Obraztsov (1959) stated that he saw no differences in the genitalia between *grunertiana* and *pactolana*, and as he regarded such differences as the only criterion in separating species at the specific level, he accordingly synonymised the two taxa. Obraztsov had a great influence on the taxonomy of Holarctic Tortricidae at that time, and his view was followed in later literature, e.g. by Danilevsky & Kuznetsov (1968). However they stated that they did not study this problem themselves. The biology of *grunertiana* was meanwhile described again in detail by Schremmer (1959), who treated it as a separate species. Patočka (1960) recorded *grunertiana* from Slovakia, and Klimesch (1961) referred to Schremmer's findings, and this was, to our knowledge, the last time that *grunertiana* was referred to as a separate species. It was listed by Pröse (1987) as an "Art unklarer Taxonomie". The taxon was not even mentioned in the work on the Central European Tortricidae by Hannemann (1961).

### ***Cydia grunertiana* (Ratzeburg, 1868)**

*Tortrix grunertiana* Ratzeburg, 1868 : 414-415, pl. 5, Fig. 9, 9l, 9P.

*Grapholitha* [sic !] *grunertiana* (Ratzeburg) ; Rebel, 1907 : (95)-(96) ; Schütze, 1931 : 38 ; Eckstein : 1931 : 104.

*Grapholitha* [sic !] *pactolana grunertiana* (Ratzeburg) ; Schütze, 1911 : 84-87 (as "var.").

*Laspeyresia grunertiana* (Ratzeburg) ; Thomann *et al.*, 1914 : 26-30, pl. 1, Fig. 4a-b, pl. 2., Fig. 5 ; Müller- Rutz, 1922 : 233 ; Escherich, 1931 : 368-370 ; Schremmer, 1959 : 15-18, Fig. 6a-c ; Patočka, 1960 : 590 ; Klimesch, 1961 : 609.

*Laspeyresia pactolana grunertiana* (Ratzeburg) ; Vorbrodt & Müller-Rutz, 1914 : 416-417 (as "a") ; Obraztsov, 1959 : 189, 198-199 (as "ab.") ; Postner, 1978 : 94 (as "ab. (?)") ; Patočka, 1982 : 277, Figs 14-17 (as "f.").

*Grapholitha* [sic !] *pactolana* (Zeller) (part) ; Rebel, 1901 : 122.

*Laspeyresia pactolana* (Zeller) (part) ; Kennel, 1908-21 : 660-661 ; Danilevsky & Kuznetsov, 1968 : 550-553 ; Kuznetsov, 1978 : 658.

*Cydia* (*Cydia*) *pactolana* (Zeller) *grunertiana* (Ratzeburg) ; Razowski, 1991 : 57-58 (as "form").

ADULT (Figs 1, 2): Wingspan: 12.5-14.5 mm, female 13.5-16.0 mm. Head, neck, thorax and tegulae light blackish grey. Ground colour of forewing white, overlaid with blackish grey scales, except for a number of irregular yellowish white, transverse lines in middle of the wing, and 5-6 distinct costal margins. Many of the dark scales in distal half of forewing with light yellowish tips giving a fine irrorate impression. Transverse lines here of a violet metallic colour, especially around ocellus. Here 3-5 black dashes often fractured and sometimes reduced to a series of dots. Cilia grey with a black basic line, interrupted by 1-4 yellowish whitish dashes. Hindwing dark grey; cilia light with dark basal line. Underside of forewing dark greyish with yellowish markings along costa and cilia area. Cilia blackish grey. Underside of hindwing light grey with a few yellowish spots at apical angle. Patch of light yellowish scales missing (Fig. 5).

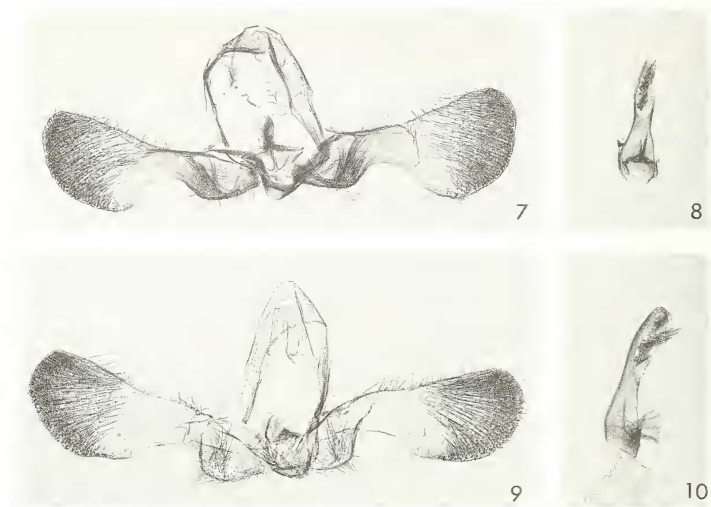
In *C. pactolana* (Figs 3, 4) (wingspan male 11.0-14.5 mm, female 12.0-17.0 mm) head, neck, thorax, and tegulae are light brownish grey. Ground colour of forewing yellowish, overlaid with olive-brown. Tip of scales in outer half more distinct yellow, and covering a wider area of the wing than in *grunertiana*. Underside of hindwing in male with an elongate-ovate patch of light yellowish scales along inner margin from base to tornus (Fig. 6).

MALE GENITALIA (Fig. 7): Valva with cucullus more or less ball-shaped; notch in ventral margin hemispherical. Aedeagus (Fig. 8) short and straight with 23-29 cornuti.

In *pactolana* (Fig. 9) cucullus is elongate rounded; notch in ventral margin is more triangular. In preparations this species often shows a fold running from base of notch across the valva. Aedeagus (Fig. 10) one sixth to one fifth longer than in *grunertiana*, with 23-35 cornuti.

FEMALE GENITALIA (Fig. 11): Very similar to and not with certainty separable from those of *pactolana* (Fig. 12).

BIONOMICS: The biology of *grunertiana* has already been dealt with several times in the German language (Schütze, 1911, Thomann, 1914, Escherich, 1931, and — in great detail — Schremmer, 1959), and it shall only be summarised here. The eggs are laid on trunks of larch (*Larix*), mostly between 1 and 3 metres above the ground, just beneath a twig or a small branch. Trees 15-30 years of age, growing on sunny sides of a plantation (Fig. 15), are preferred, and on one such suitable tree PF once counted about 45 larval spawnings. During summer and autumn the small larva tunnels in the bark (making a sort of bark mine), and the presence of a larvae is shown by a small heap of reddish frass. As the larva grows it tunnels deeper into the bark and bast.



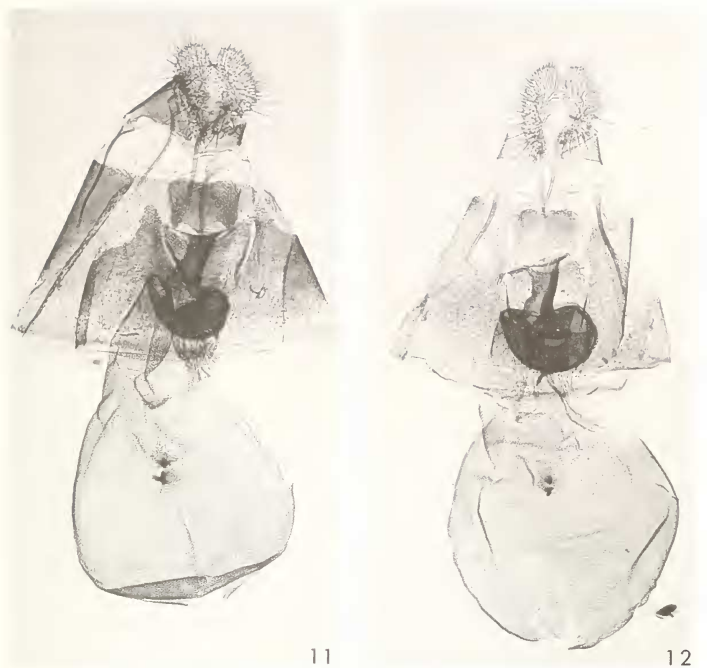
Figs 7-10. Male genitalia (7,9) and aedeagi (8,10) of *Cydia* spp. 7,8 — *Cydia grunertiana* (Rtzb.) (Prep. OK 4712) ; 9,10 — *C. pactolana* (Zell.) (Prep. OK 4710).

but it does not work into the wood. The infected bark is now easily recognisable by a protrusion of resin and abundant reddish-brown frass (Figs 13, 14). The larva hibernates in an immature stage, continuing feeding in the spring. Pupation takes place inside the feeding gallery during May, and the perfect insect is out in June.

In spring the larva is about 10-12 mm long, yellow- or greenish-whitish and often with a reddish tinge. The head is brown with a darker V-shaped mark and two dark spots on each side. The prothoracic plate, which is divided in the middle, is brown, and the anal plate is light brown. The whole larva is hairy. The pupa was described and figured by Patočka (1982).

We have found *grunertiana* on both *Larix decidua* L. and *L. kaempferi* Lamb., and on their hybrid *L. x marschlinsii* Coaz = *L. x eurolepis* Henry (Christensen, in prep.).

As *grunertiana* is rarely found as an adult, it is fortunate that it can be easily detected in the larval stage. However, when collecting the larva, which is best done in the spring, one should take great care



Figs 11-12. Female genitalia of *Cydia* Hb. 11 — *C. grunertiana* (Rtzb.) (Prep. OK 4714); 12 — *C. pactolana* (Zell.) (Pep. OK 4709).

that no resin enters into its gallery, as this will kill the larva. It is our experience that one should cut out a small triangle of bark and wood with the whole of the gallery (Fig. 13), and place it in a box on some moist sand. Then the adult will appear in a few weeks.

The biology of *C. grunertiana* differs from that of *pactolana* in that the larva of the latter tunnels into bark of spruce (*Picea*). It prefers younger trees (5-15 years), and it feeds in the upper part of the tree.

### Comments

Even though the forewing markings of *grunertiana* resemble those of *pactolana* the two species look strikingly different. This is due to the



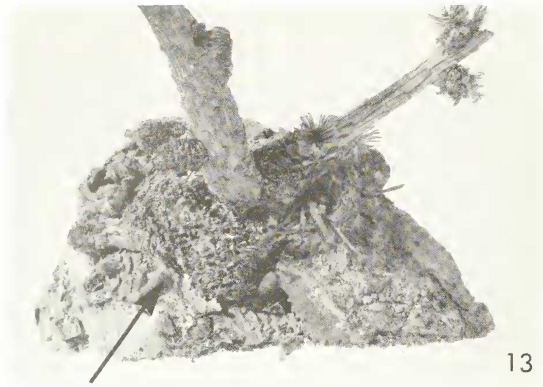


Fig. 13. Spinning with frass of *Cydia grunertiana* (Rtzb.) on *Larix* (indicated by arrow).  
Fig. 14. Same, but with extruded pupal skin.

difference in the main colour of the forewing: blackish brown in *grunertiana*, light brown to olive-brown in *pactolana*. Moreover, the presence of the light yellowish elongate-oval patch on the underside of the hind wing in *pactolana* easily separates males of that species





Fig. 15. Plantation of *Larix x marschlinsii* Coaz, where *Cydia grunertiana* (Rtzb.) occurs : Denmark, E.J. Løvenholm.

from males of *grunertiana*. Differences in genitalia are indeed not striking, but on the other hand they are as prominent as in a number of other closely related species within the tribe Grapholitini.

As we thought that the scales in the elongate-oval patch on the underside of the hindwing could have a function in the precopulatory isolation mechanism of the two taxa, these scales were studied with the help of a scanning electron microscope (SEM). Seen at high magnification these scales look like a cheese with holes. In the first two specimens studied we found a striking difference in the number of these perforations in that the scales of the *grunertiana* had only a few perforations compared with the numerous perforations in the *pactolana* specimen. However, a study of additional specimens showed that this is a variable character. Before one is able to conclude if this is a specific character, a study of a larger material is needed. This

is beyond the scope of the present study, and not necessary for proving that the two taxa in question are separate species.

Besides the above mentioned diagnostic characters separating *grunertiana* from *pactolana*, the differences in biology between these two taxa are so striking that all microlepidopterists dealing with their biology came to the conclusion that they are separate species. We are of the opinion that our study of the adults presented here supports the results obtained by students of the biology of these taxa: *grunertiana* is a species separate from *pactolana*.

### Distribution

With certainty known only from Central Europe: **Austria**: Vienna area (Schremmer, 1959), E. Tyrol, Glocknergruppe, above Burg, 1500 m, old spinings of larvae on trunks of *Larix*, 27.vii.1991 (O. Karsholt); **Czech Republic**: Moravia or., Zlín, V. Elsner leg. (Laštůvka, in litt.); **Denmark** (Eastern Jutland, Zealand, Bornholm); **Germany**: Dresden area (Schütze, 1911); **Poland**: Only recorded from Silesia (Ratzeburg, 1868), but known from several other parts of the country (Buszko, pers. comm.); **Slovakia** (Patočka, 1960); **Switzerland**: Graubünden (Thomann *et al.*, 1914) (\*).

As *grunertiana* lives a very secretive life, especially in the adult stage, it will most probably turn out to have a wider distribution. Danilevsky & Kuznetsov (1968) mention a female specimen from Irkutsk, which they considered could possibly belong here. OK studied that specimen in the collection of ZIAS in St. Petersburg, but it belongs neither to *grunertiana* nor to *pactolana*, and he saw no other specimens of *grunertiana* from Russia in that collection. This supports our view that we are not dealing with a species with an eastern distribution, which has colonised Europe, and that *grunertiana* is probably a Central European species, which is now spreading northwards.

No *Larix* species are native in Denmark, but larch trees are now commonly planted all over the country. Larch-feeding species like *Teleiodes saltuum* (Zeller) and *Ptycholomoides aeriferana* (Herrich-Schäffer) have become common here during the last 50 years. It is not possible to say how or when *grunertiana* has immigrated to Denmark, and not a single specimen from Denmark has turned up in collections here.

(\*) *Note added in press*: In 1993, larvae of *C. grunertiana* were found in Sweden: E. Scania (I. Svensson in litt.).

## Acknowledgements

We wish to acknowledge the help received from : Niels P. Kristensen, ZMUC, Copenhagen, for comments on the manuscript, and for taking SEM photographs ; J. Buszko, UMK, Torun, Poland, for translating Russian literature, and for giving information on distribution ; Ib Christensen, Arboretet, Hørsholm, Denmark, for identifications of *Larix* species ; V. I. Kuznetsov, ZIAS, St. Petersburg, for permission to study the collections under his care ; P. Huemer, TLMF, Innsbruck, Z. Laštůvka, MMB, Brno, J. Patočka, Zvolen, Slovakia, and S. Whitebread, Magden, Switzerland, for information and literature. The photographs were kindly taken by G. Brovad (Figs 1-6, 13-14), and the late B. W. Rasmussen (Figs 7-12) ; Fig. 15 was photographed by PF.

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